CLAIMS

1. Radial slaving method for a device for reproducing information from an optical disc, in which the information stored on the disc in the form of alterations arranged along predetermined tracks of the disc is explored by a laser beam, which converges at a spot on the optical disc and results in a beam emerging from the said disc by reflection or transmission, the said device being equipped with a multi-photodiode far-field detection system for detecting the said emergent light beam, the said method being characterized in that it consists in:

- combining the read signals of the said photodiodes of the said detection system so as to form four read subsystems (1, 2, 3, 4) having two pairs of subsystems, the subsystems of each pair (1, 2; 3, 4) being arranged on either side of a first axis (Ox) parallel to the image of the axis of the track being explored, and the said pairs being arranged on either side of a second axis (Oy) perpendicular to the said first axis, the said first and second axes being axes of symmetry for the said detection system, the said method being characterized in that the said step of combining the read signals of the said photodiodes consists in taking the difference between the read signals of two subsystems belonging to different pairs (1, 3; 2, 4) in order to form a read signal (diag1) along a first diagonal of the detection system and a read signal (diag2) along a second diagonal of the detection system;

- phase-comparing the signals (diag1; diag2) obtained by each of the two subsystems in order to obtain a radial error signal (Sr) substantially proportional (Ar) of the radial tracking.

2. Method according to Claim 1, in which the subsystems (1, 2, 3, 4) consist of the photodiodes of a four-quadrant detector.

3. Method according to Claim 2, characterized in that the said step of phase-comparing the read signals (diag1, diag2) along the said first and second diagonals consists in performing a cross-correlation between each read signal of one diagonal and the signal of the other diagonal, to which a predetermined delay is assigned.

4. Method according to Claim 3, characterized in that the said predetermined delay is selected as a function of the maximum frequency of the read signals and the modulation depth of the said optical disc.

5. Method according to one of Claims 3 and 4, characterized in that the said predetermined delay is selected to be less than the clock period of the information to be read.

6. Method according to any one of the preceding claims, characterized in that it furthermore includes a rapid pre-correction step, which consists in dynamically adjusting the delays of the said read signals (diag1, diag2) along the said first and second diagonals, in the channels for constructing the readout signal (S_{HF}), as a function of the said radial error signal (Sr).

7. Method according to Claim 6, characterized in that said rapid pre-correction step consists in:

- filtering the said radial error signal in order to keep only the high-frequency components of the said signal;

- determining an inverse variation of the said delays as a function of the said high-frequency component values, in order to minimize the phase-shift effects of the readout signal (S_{HF}).

8. Device for reproducing information from an optical disc, in which the information stored on the disc (10) in the form of alterations is arranged along predetermined tracks (11) of the disc, the said reproduction device comprising a light source (13) for providing an incident light beam, first optical means (14, 15, 16) for making the said beam converge at a spot on the optical disc (10), second optical means (16, 15,

17) for splitting the beam emerging from the said disc and resulting from reflection or transmission of the incident beam by the disc, and a multi-photodiode detection system (18) arranged in the far-field in the path of the said emergent beam in order to detect the said light beam, the said reproduction device being characterized in that it furthermore comprises:

- first combining means (21, 22), which receive the individual read signals (d1, d3; d2, d4) of the said photodiodes (1, 2, 3, 4) in order to construct two read signals (diag1, diag2) corresponding to two subsystems, the sensitivity functions of which in the plane of the disc make two symmetrical angles with the direction (Ox) of the track being explored;

- second phase comparison means (100) for comparing the phases of the said two read signals of the subsystems and providing a radial error signal (Sr).

9. Reproduction device according to Claim 8, in which the multi-photodiode detection system (18) consists of a four-quadrant detector (1, 2, 3, 4) having two pairs of photodiodes, the photodiodes of each pair (1, 2; 3, 4) being arranged on either side of a first axis (Ox) parallel to the image of the axis of the track being explored, and the said pairs being arranged on either side of a second axis (Oy) perpendicular to the said first axis, the said first and second axes being axes of symmetry for the said detection system, the said reproduction device being characterized in that the said first combining means comprise two differential circuits (21, 22), which respectively receive the signals of two photodiodes (1, 3; 2, 4) belonging to the two respective diagonals of the said detection system and each provide the difference (diag1, diag2) between the received signals as a read signal along a first and a second diagonal.

10. Reproduction device according to Claim 9, characterized in that the said second phase comparison means consist of a circuit (100) for cross-correlation of

each diagonal read signal with the signal of the other diagonal, to which a predetermined delay is assigned.

11. Reproduction device according to Claim 10, characterized in that the said cross-correlation circuit (100) comprises two processing channels (101, 103, 105, 107; 102, 104, 106, 108), respectively processing the read signal along the first diagonal (diag1) and the read signal along the second diagonal (diag2), each channel comprising at least:

- a band-pass filtering circuit (101; 102) which receives the corresponding read signal;
- a multiplier (105; 106) which receives the signal filtered by the said filtering circuit on one input;
- a delay circuit (107; 108) which receives the said filtered signal and is connected to the other input of the multiplier of the other channel;

and in that the said cross-correlation circuit furthermore comprises:

- a differential circuit (109) which takes the difference of the signal is provided by the two multipliers (105, 106); and
- a low-pass filter (110) connected to the said differential circuit (109) for providing the said radial error signal (Sr).

12. Reproduction device according to any one of Claims 9 to 11, characterized in that furthermore includes a adder circuit (30), which receives the signals of the said to differential circuits (21, 22) and provides a readout signal (S_{HF}) for the information stored on the disc.

13. Reproduction device according to Claim 12, characterized in that, in order to perform a rapid pre-correction of the read signals, the said reproduction device furthermore comprises:

- at the output of each of the said differential circuits (21, 22), a variable delay circuit (CRv1, CRv2) which has a delay control input;

- an adjustment circuit (32) connected to the control inputs of the variable delay circuits; and

- high-pass filtering means (31) connected between the output of the second phase comparison means (100) and the said adjustment circuit (32), the said adjustment circuit controlling the variable delay circuits in reverse as a function of the high-frequency part of the said radial error signal (Sr).